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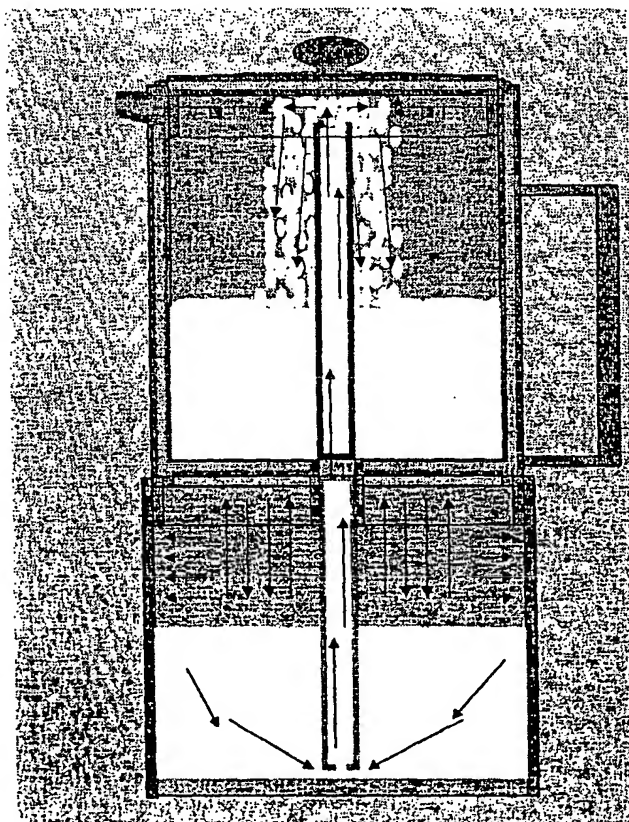
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(54) Title: MICROWAVW MILK JUG



(57) Abstract: The present invention consists of a microwave (oven)-driven milk boiling device, serving to boil natural milk-powder or to make chocolate or similar items, or to make cappuccino or "coffee with milk-powder", or even to boil water; all under pressure, in a preset time, being useful also to verve directly to the table. It boils milk in a lower container, having a safety valve and conveys the boiled milk to another container above it, which is done within a period of 2 minutes, which time may vary according to the microwave oven used.

WO 02/060304 A1

WO 02/060304 A1



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**MICROWAVE MILK JUG (FIGURE 1 – Cross-section – scale 1:1)**

The present invention consists of a microwave(oven)-driven milk boiling device, serving to boil natural milk or milk-powder or to make chocolate or similar items, or even to boil water; all done under pressure, in a prestipulated time, it being useful further to serve directly to the table, with original conception, in view of its efficient use.

The invention is a novelty, there being no notice of a similar domestic or foreign one for use in microwave oven, as conceived.

As is well-known, milk usually is brought to a boil under fire action and when reaching boiling point, the liquid comes to ebullition and grows in volume, thereby forming gaseous bubbles which rise within the container, which is then removed from the fire to prevent spillage. There is a milk jug that uses a cone within a coverless pan-shaped container, which allows the milk to remain boiling, both in the fire and in a microwave oven.

The present invention brings milk to a boil in a filled container and place milk already boiled in another container, within a period of 2 minutes, which may vary depending on the microwave oven used. Milk placed in the second container does not spill, because such a container contains walls, bottom and a plastic-covered aluminum cap, proper to use in microwave and food.

Heat until the boiling point occurs because, under microwave action, friction of mixed liquid and solid molecules is initiated and, with the boiling, steam is formed with a force sufficient to impel the liquid of the bottom container through two (2) sequential tubes, to fall into the upper container, ready to serve at the table and where it is no more re-boiled in view of the aluminum protection.

Both pure milk and chocolate can be boiled likewise, after adding powder to cold or warm milk.

Likewise, it also makes *milk with water and milk-powder*, and further *cappuccino* or coffee with milk-powder, simply adding powder

thereof to cold or warm water and then operate the microwave oven for the same period of time as to boil natural milk.

Thus, one may obtain perfectly sterilized liquids, in a perfect manner for alimentation, specially for babies, when milk-powder is used and that, in order to become pure, must be prepared in sterilized water.

### **I – DESCRIPTION OF MATERIAL USED AND PARTS**

**MATERIALS:** In the making of parts to be described below, microwave oven-resistant and proper to food materials are used, the internal walls of the boiling container being made in aluminum and covered with plastic; in all parts, imported plastic (Polyeter Imida PEI) will be used, which is unbreakable, transparent, resistant to high temperatures, proper for microwaves and meets FDA standards in USA, or other standards produced in Brazil or abroad, which may have at least the same technical specifications as that.

**PARTS** (numbered as FIGURES, in SCALE 1:1).

**BOILING CONTAINER** – (FIGURE 2 – Cross-section and FIGURE 3 – Topview): a cylinder-shaped plastic container having a mouth in the upper part with about 9 cm dia; at the external part, near that mouth, it has 4 points in solid cubic format (1), with face with about 0,5mm, and which will serve to fasten this part to the SERVING CONTAINER – FIGURE 4; it has a base (3) with about 0,5 cm height, formed by the extension of its side walls beyond the bottom; and in outside part, near the mouth, it has a minuscule excavated space (2) with the same thickness as this wall, in a concave half-sphere format, with the larger diameter (0,5mm) turned outwards, intended to form a Safety Valve together with the external piece (2), which is a rectangular lug-shaped fixed support, where the part named PRESSURE SEALING – FIGURE 8 will fit.

**SERVING CONTAINER** – (FIGURE 4 – Cross-section and FIGURE 5 – Topview section): aluminum mug-shaped cylindrical container (4) entirely covered with plastic; it contains a mouth (5) of

about 9 cm dia. in the upper part, containing in the bottom a hole with approximately 1 cm dia (6) with plastic cylindrical walls around it, which rise both to the internal part for about 2 cm (7) and likewise to the outside part (7) and which serve to fasten the 2 liquid conducting tubes of FIGURE 6 and FIGURE 7; it has further a small ring-shaped base (8) (extension of side walls beyond the bottom), containing L-shaped notches (8) and which will serve to fit the SERVING CONTAINER of FIGURE 2; it contains one external lug (9) to hold the MICROWAVE MILK JUG – FIGURE 1, which is hollowed in its horizontal parts (10) which connect it with the container; and above, in the outside part, near the mouth, it has four 0.5mm points in a solid cubic format (11) which will serve to hold the MILK JUG CAP – FIGURE 10; it has further, in the upper part, one liquid outlet nozzle (12) to serve at the table.

**LIQUID CONDUCTING TUBES** – (FIGURES 6 and 6.1) – Cross-section and topview; and FIGURES 7 and 7.1 – Cross-section and topview): made in plastic in cylindrical format, with a size near container height and diameter of about 1 cm; the first tube of FIGURES 6 and 6.1 fits through outside pins of solid cubic formats (13) that it has near one of the ends, at the internal base of the bottom center of the SERVING CONTAINER of FIGURE 4; and in the other tube of FIGURES 7 and 7.1, which, in addition to be equal to that and fit to the base externally located in the bottom center of SERVING CONTAINER of FIGURE 4, it further has 2 rectangular notches (14) around the final part of its mouth, which will serve for entrance of liquids, which will be done under pressure; in the occasional obstruction of the tube, the safety valve of the BOILING CONTAINER of FIGURE 2 will be operated.

**PRESSURE SEALING** – (FIGURE 8 – Cross-section and FIGURE 9 – topview section); a rectangle-shaped plastic piece, having in one of its ends and in the width part, the added format of a convex half-sphere, which will fit into the concavity (2) existing in the side wall near the mouth of the BOILING CONTAINER – FIGURE 2 for sealing, and

holding to the external lug (2) as it is seen in MICROWAVE MILK JUG – FIGURE 1, thereby forming the Safety valve of this container.

**SERVING CONTAINER CAP** – (FIGURE 10 – Cross-section and FIGURE 11 – topview section): made in plastic and cylindrical format, it contains in its upper part a round shape gripper (15) in order to grip it, and a cylinder-shaped side wall (16) containing 4 L-shaped hollows, intended to fit into the mouth of the SERVING CONTAINER of FIGURE 4.

**II – DEMONSTRATION OF INVENTION OPERATION: FILLED BOILING CONTAINER – FIGURE 12; SERVING CONTAINER WITH TUBES ADDED – FIGURE 13; MILK JUG READY TO BOIL – FIGURE 14 ; MILK JUG BOILING MILK – FIGURE 15; MILK JUG WITH BOILED MILK TO SERVE – FIGURE 16.**

MILK JUG operation is now demonstrated, whose procedures are mostly common in its general use. The BOILING CONTAINER is taken at normal position, that is, with mouth upwards, and place in it natural milk or previously mixed with filtered water or chocolate or chocolate products, or *cappuccino* powder, or coffee powder with milk, in the recommended measures, and mix until dissolving, the same procedure to fill as shown in FIGURE 2 being allowed. The objective is obtaining the liquid boiled and sterilized to drink. Then, as it is seen in FIGURE 13, one places the two (2) liquid conducting tubes (18), which are fastened to the bottom of the SERVING CONTAINER, in its internal and external parts; afterwards, as is shown in FIGURE 14, the two containers (19) are fitted and the CAP (20) is placed into the SERVING CONTAINER, the MILK JUG being then ready to be taken to microwave oven for the time stipulated, in this case, approximately 2 minutes. As it can be seen in FIGURE 15, through indicative arrows, in the bottom part of the BOILING CONTAINER, the liquid, through the action of microwaves, will start its boiling process that, in being initiated, will produce the transformation of the liquid into steam, that in turn will be

accumulated in the small empty space without milk, thereby producing pressure for all sides, causing, by force of the pressure exercised, the liquid to leave by the only place possible, that is, the bottom of the container, where the tube hole is located and in penetrating therein, it  
5 will rise by the first tube of this container and then, by the second SERVING CONTAINER tube in order to beat its CAP and falling therein under gravity, internally, ready to serve, as it is seen in FIGURE 16.

A table for heating time with temperature ranging according to the microwave oven brands, and in accordance with the content of the liquid  
10 preparation to boil, will accompany the device, for user's guidance who, thus, will end up knowing in a short period of time, the own table for the temperature times to be used in his/her microwave oven.

**CLAIMS.**

1°) **MICROWAVE MILK JUG** (FIGURE 1 – Cross-section – Scale 1:1), characterized for having one Final Element, composed of the following parts:

5           a) **BOILING CONTAINER** – FIGURE 2 – Cross-section and FIGURE 3 – Topview section): a cylinder-shaped plastic container having a mouth in the upper part with about 9 cm diameter; in the outside, near that mouth, it has 4 points in solid cubic format (1) with face around 0.5mm, and which will serve to fasten this part to the  
10           **SERVING CONTAINER** – FIGURE 4; it has a base (3) with about 0.5 cm height, formed by the extension of its side walls beyond the bottom; and in outside part, near the mouth, it has a minuscule excavated space (2) with the same thickness as this wall, in a concave half-sphere format, with the larger diameter (0,5mm) turned outwards, intended to  
15           form a Safety Valve together with the external piece (2), which is a rectangular lug-shaped fixed support, where the **PRESSURE SEALING** – FIGURE 8 will fit.

          b) **SERVING CONTAINER** – (FIGURE 4 – Cross-section and FIGURE 5, – Topview section): aluminum mug-shaped cylindrical  
20           container (4) entirely covered with plastic; it contains a mouth (5) with about 9 cm diameter in the top, containing in the bottom a hole with approximately 1 cm dia. (6) with plastic cylindrical walls around it, which rise both to the internal part for about 2 cm (7) and likewise to the external part (7) and which serve to fasten the 2 liquid conducting tubes  
25           of FIGURE 6 and FIGURE 7; it has further a small ring-shaped base(8) (extension of side walls beyond the bottom), containing L-shaped notches (8) and which will serve to fit the **SERVING CONTAINER** of FIGURE 2, contains 1 external lug (9) to hold the **MICROWAVE MILK JUG** – FIGURE 1, which is hollowed in its horizontal parts (10) which  
30           connect it with the container; and above, in external part, near mouth, it has 4 solid cube-shaped 0,5mm points (11) which will serve to fasten



the MILK JUG CAP – FIGURE 10; it further has, in the upper part, 1 liquid outlet nozzle (12) to serve at the table.

5           c) **LIQUID CONDUCTING TUBES** – (FIGURES 6 and 6.1) – Cross-section and topview; and FIGURES 7 and 7.1 – Cross-section and topview): made in plastic in cylindrical format, with a size near the container height and diameter of about 1 cm; the first tube of FIGURES 6 and 6.1 fits through outside pins of solid cubic formats (13) containing near one of the ends, at the internal base of the bottom center of the SERVING CONTAINER of FIGURE 4; and in the other tube of 10 FIGURES 7 and 7.1, which, in addition to be equal to that and fit to the base externally located in the bottom center of SERVING CONTAINER of FIGURE 4, it further has two rectangular notches (14) around the final part of its mouth, which will serve for entrance of liquids, which will be done under pressure; in the occasional obstruction of the tube, the 15 safety valve of the BOILING CONTAINER of FIGURE 2 will be operated.

          d) **PRESSURE SEALING** – (FIGURE 8 – Cross-section and FIGURE 9 – topview section); a rectangle-shaped plastic piece, having in one of its ends and in the width part, the added format of a convex 20 half-sphere, which will fit into the concavity (2) existing in the side wall near the mouth of the BOILING CONTAINER – FIGURE 2 for sealing, and fastening to the external lug (2) as it is seen in MICROWAVE MILK JUG – FIGURE 1, thereby forming the Safety valve of this container.

          e) **SERVING CONTAINER CAP** – (FIGURE 10 – cross-section 25 and FIGURE 11 – topview section): made in plastic and cylindrical format, it contains in its upper part a round shape gripper (15) in order to grip it, and a cylinder-shaped side wall (16) containing 4 L-shaped hollows, intended to fit into the mouth of the SERVING CONTAINER of FIGURE 4.

30           **2º) MICROWAVE MILK JUG** – (FIGURE 1- Cross-section -Scale 1:1) *characterized for having the same device, multifunctional*

conception of use, that is, the same device can perform, through microwave action, cooking and/or boiling of varied liquid feed, such as water and milk together with other solid and/or soluble liquids, such as coffee or chocolate.

5           **3°) MICROWAVE MILK JUG** – (FIGURE 1 – Cross-section – Scale 1:1) in accordance with claim 1°), characterized for performing, through microwave of the oven inside the device, the cooking and/or boiling of coffee or chocolate in water or milk, *and at the same time, with the pressure of steam accumulated inside the container, to produce a*  
10   *force sufficient to expel the liquid directly from a BOILING CONTAINER placed below, to another SERVING CONTAINER above, such a device thus generating force through action of microwaves of a conventional oven.*

**4°) MICROWAVE MILK JUG** – (FIGURE 1 – Cross-section – Scale 1:1) in accordance with claim 1°), characterized for being  
15   intended, in addition to obtain pure water or milk, or added with coffee or chocolate etc., boiled and ready to consumption, *the same complete device being further able to be used to serve final boiled liquids directly at the table.*

20           **5°) MICROWAVE MILK JUG** – (FIGURE 1 – Cross-section – Scale 1:1) according to claims 1°) and 2°), characterized for having a Safety Valve composed of the following parts: rectangle-shaped plastic PRESSURE SEALING – FIGURE 8 (Cross-section) and FIGURE 9 (Topview section), having in one end and in the part of width, the added  
25   form of a convex half-sphere, which will be fitted into the concavity (2) existing in the side wall near BOILING CONTAINER mouth – FIGURE 2, for sealing, and fastened to the external lug (2) as it can be seen in the MICROWAVE MILK JUG – FIGURE 1, thereby forming the Safety Valve of this container, which can be made in other formats.

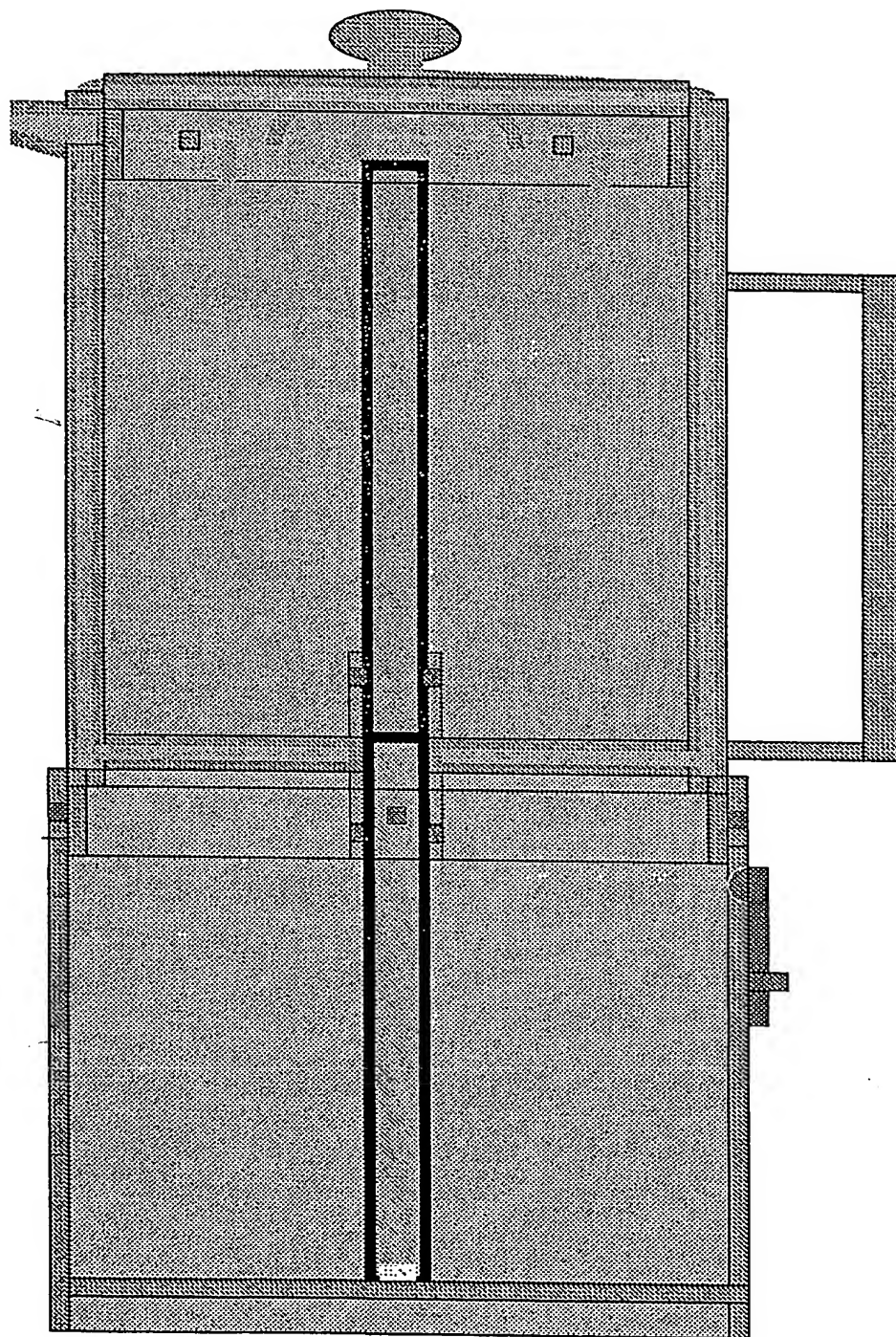
30           **6°) MICROWAVE MILK JUG** - (FIGURE 1 – Cross-section – Scale 1:1) characterized in accordance with claim 1°), for the innovative

conception of use of a plastic container to receive microwave actions and another container sealed with a metallic part in its walls in order not to receive microwave action, thereby preventing liquid spillages.



1/12

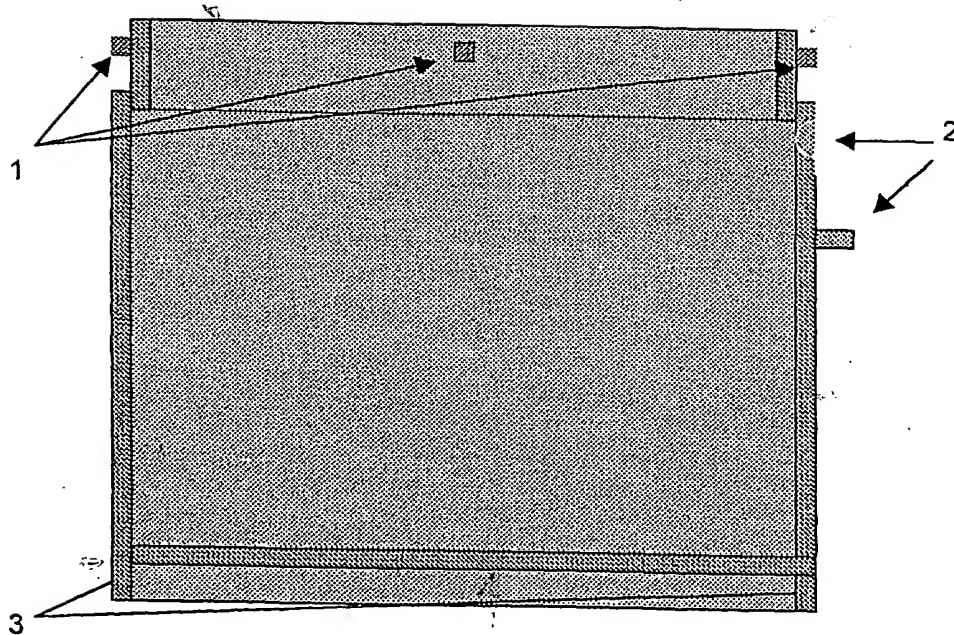
FIGURE 1



1. 2. 3. 4.

5. 6. 7. 8.

FIGURE 2



2

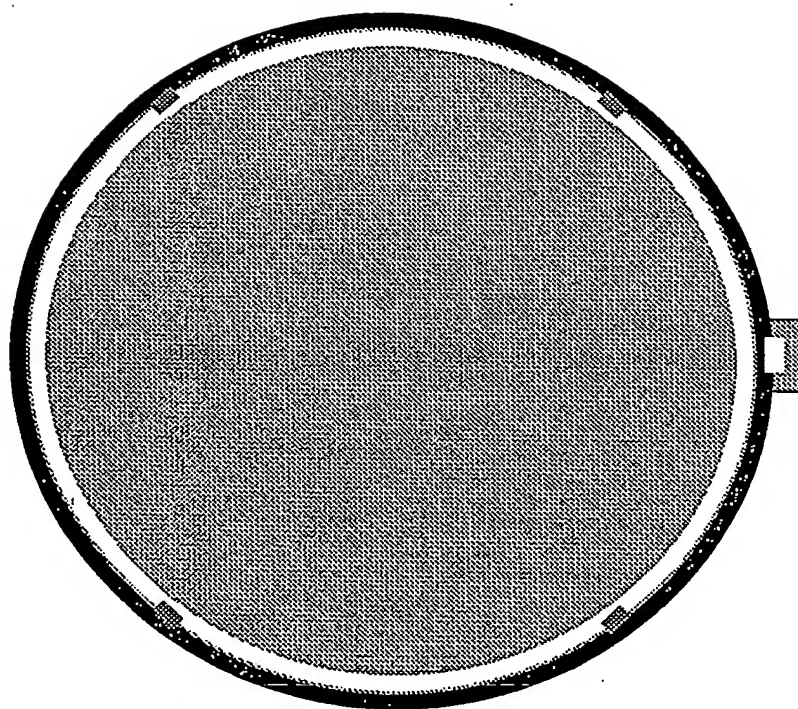
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3/12

FIGURE 3



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4/12

FIGURE 4

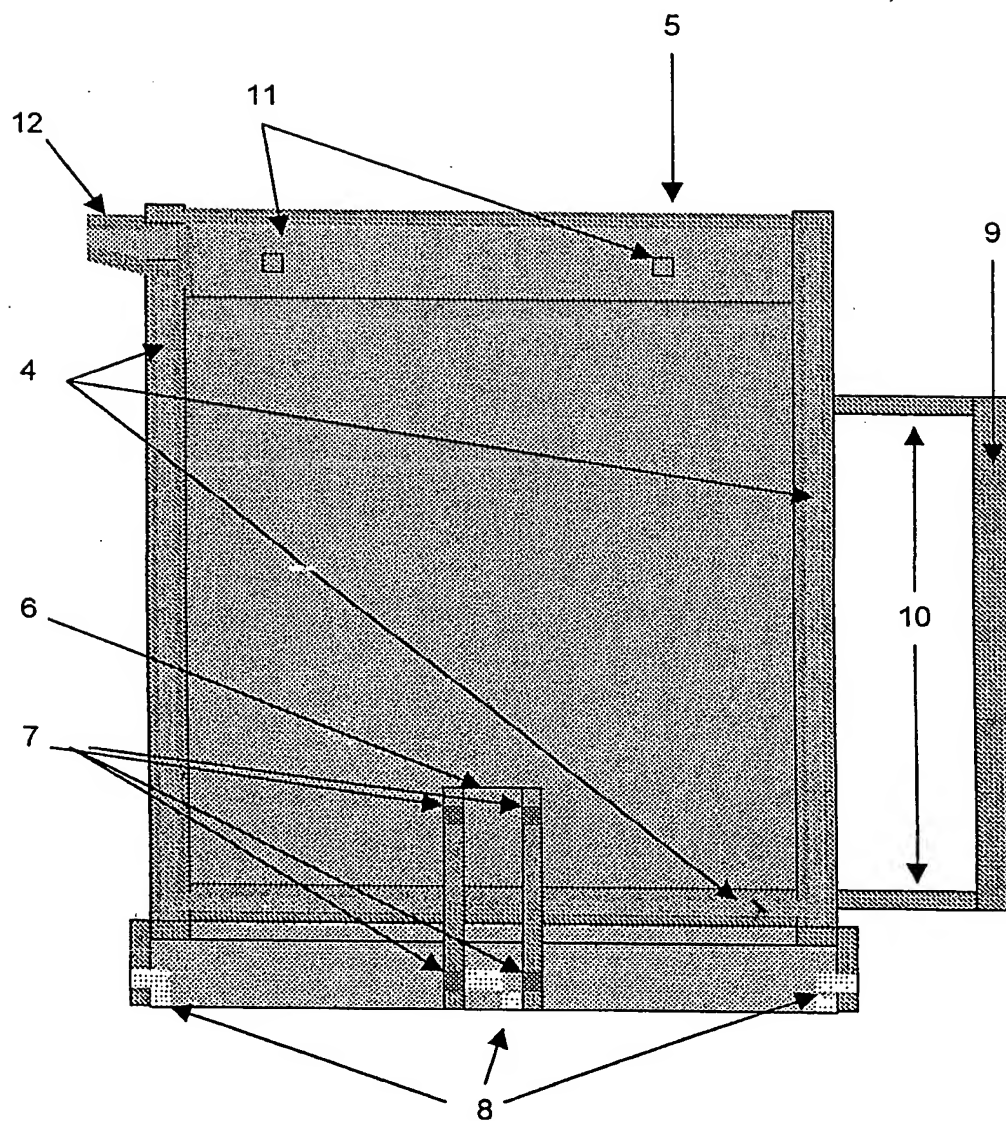
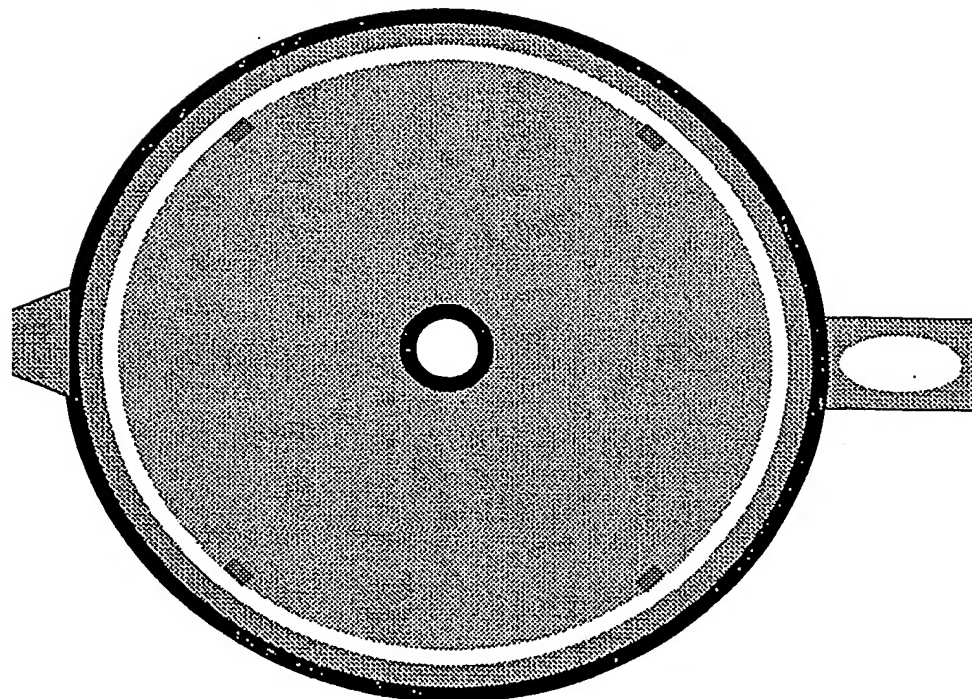




FIGURE 5



1. 2.

3. 4.

5. 6.

6/12

FIGURE 6

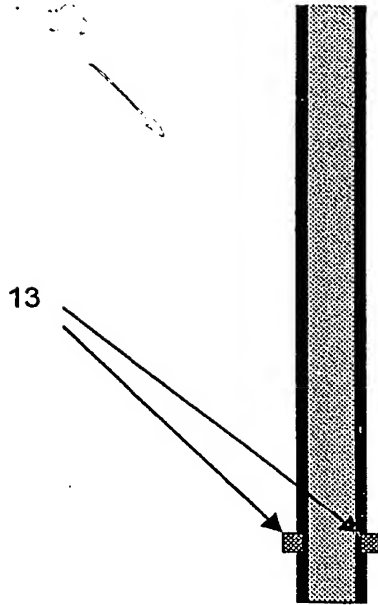


FIGURE 6.1.



FIGURE 7

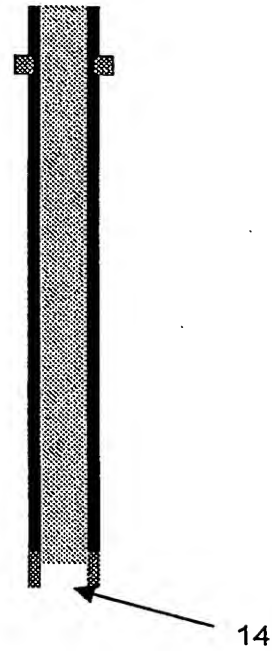


FIGURE 7.1.



FIGURE 8



FIGURE 9



2

3

4

5



7/12

FIGURE 10

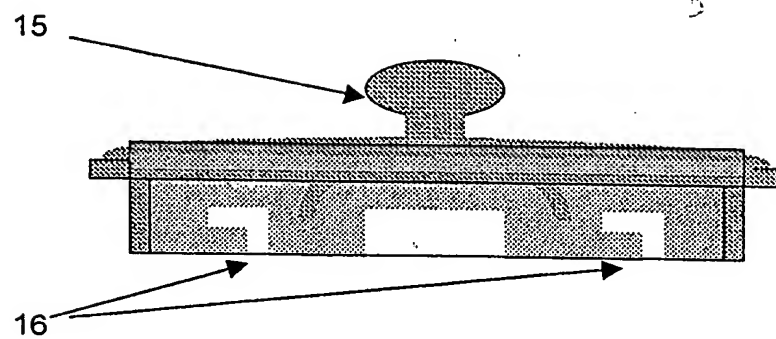
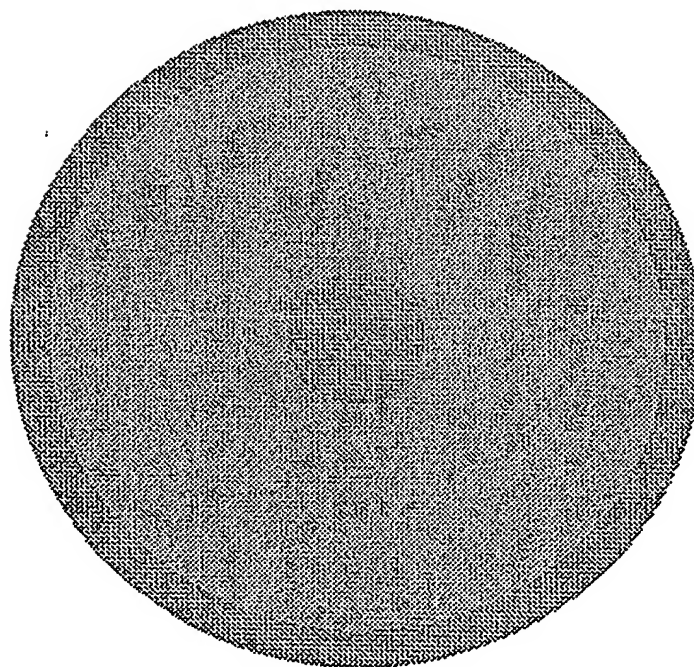


FIGURE 11



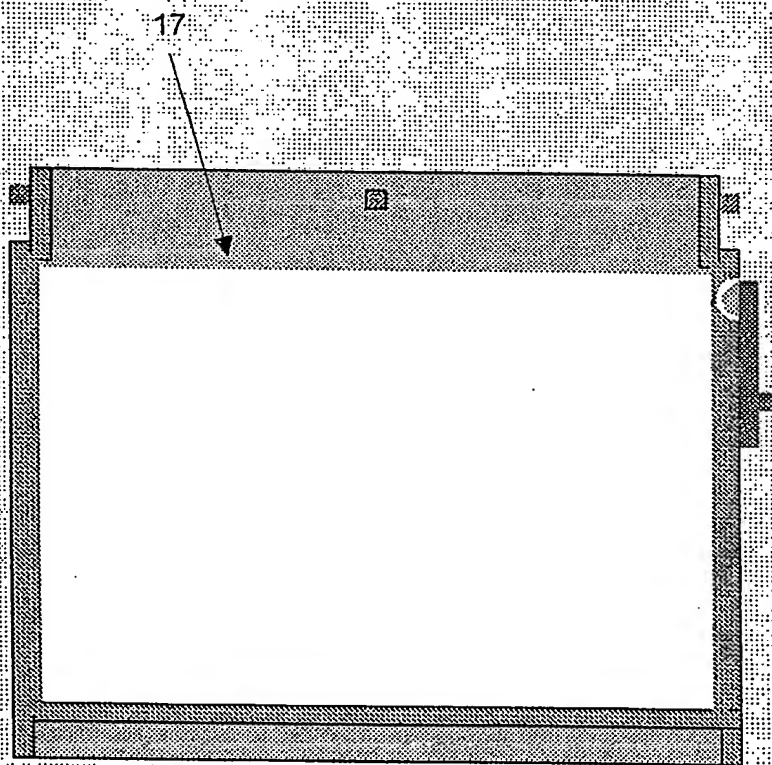
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FIGURE 12



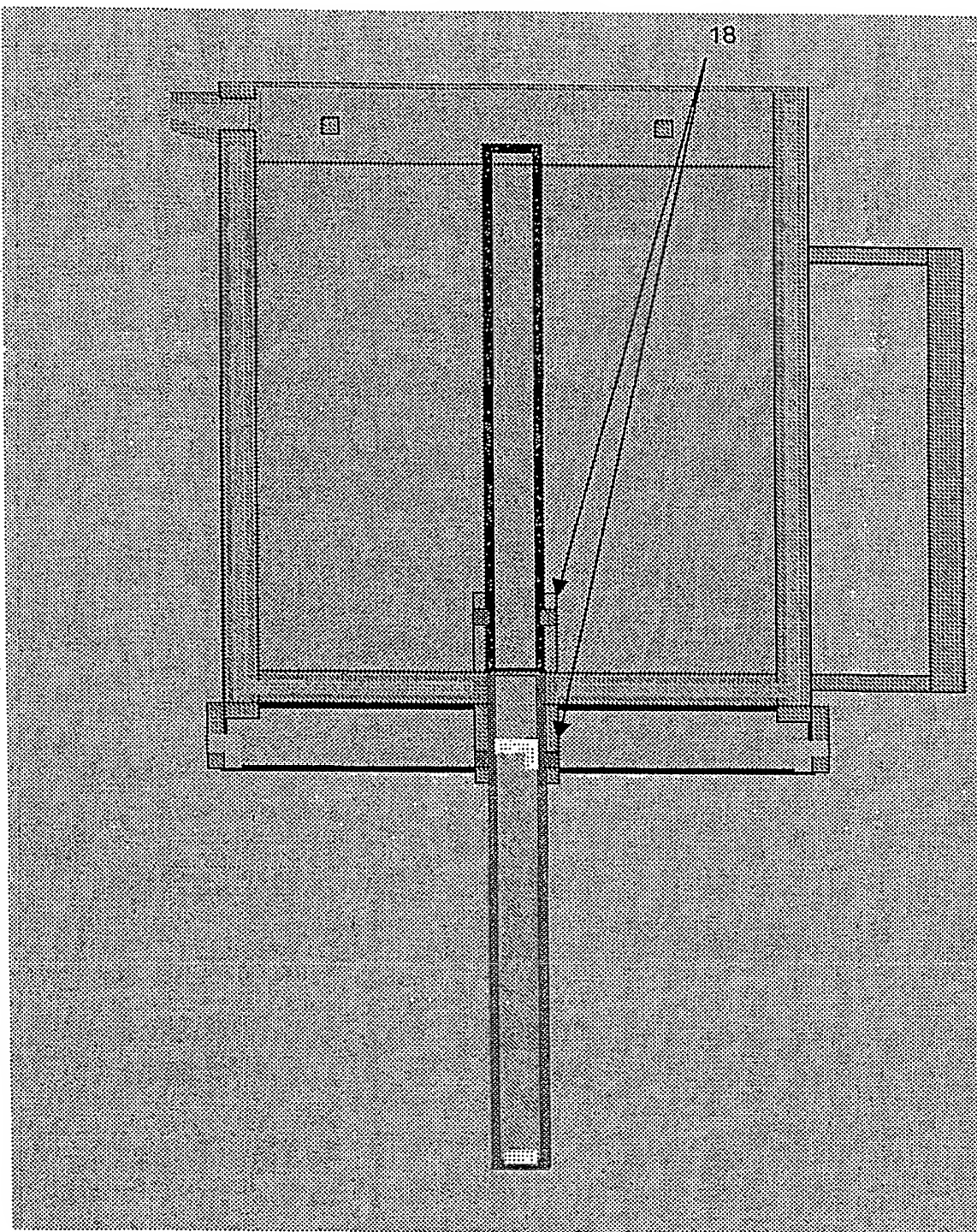
1. 1

2. 2

3. 3

9/12

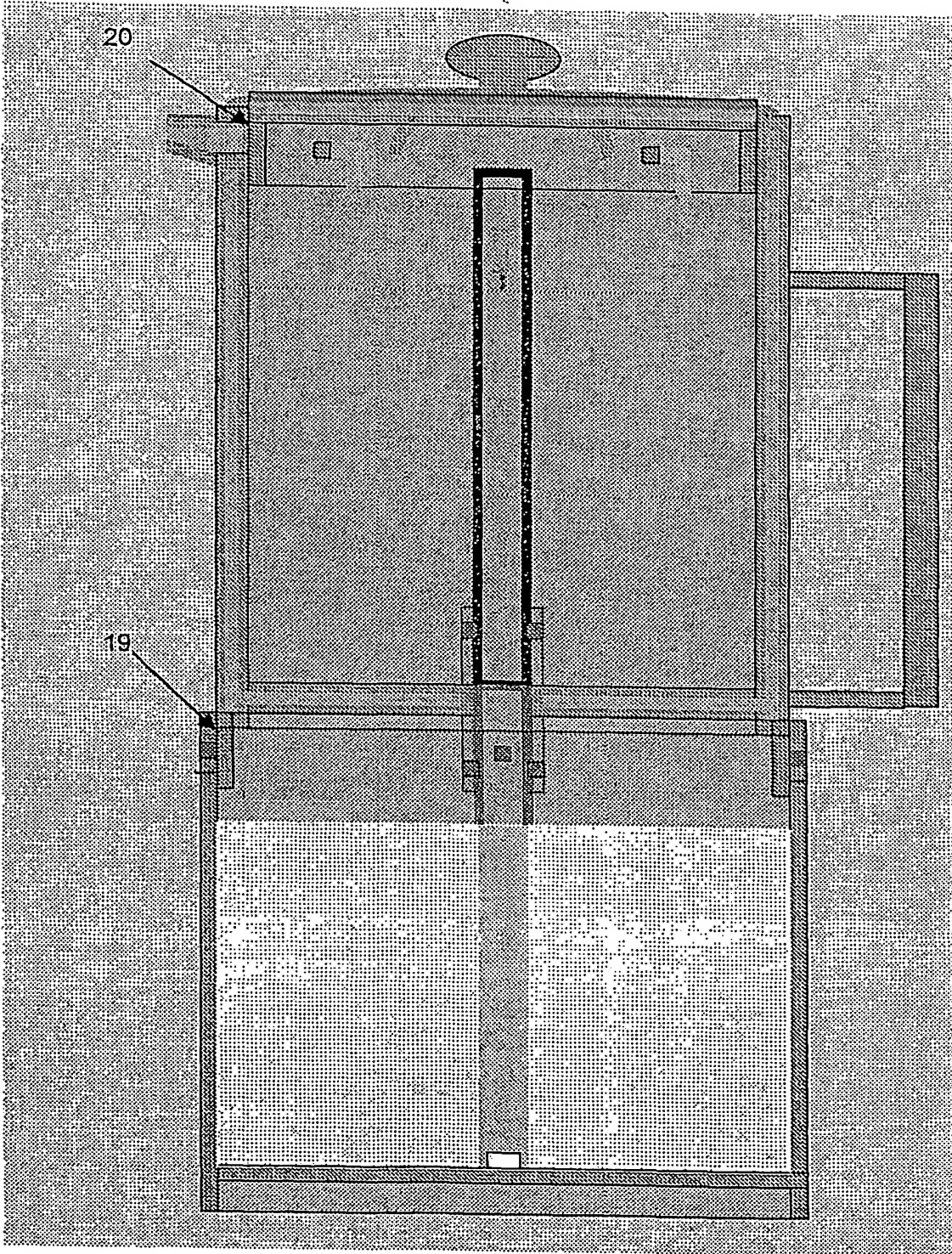
FIGURE 13





10/12

FIGURE 14

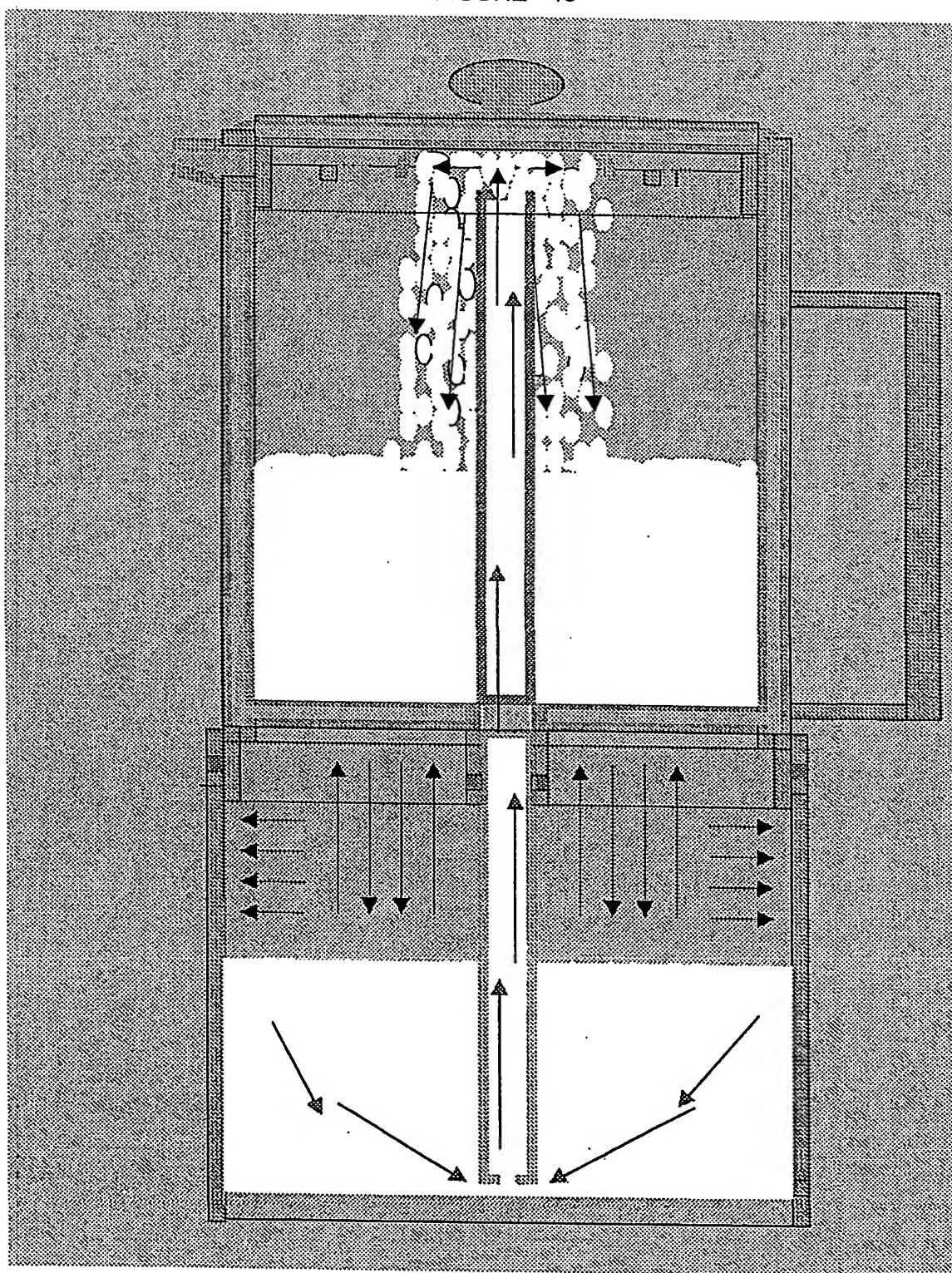






11/12

FIGURE 15



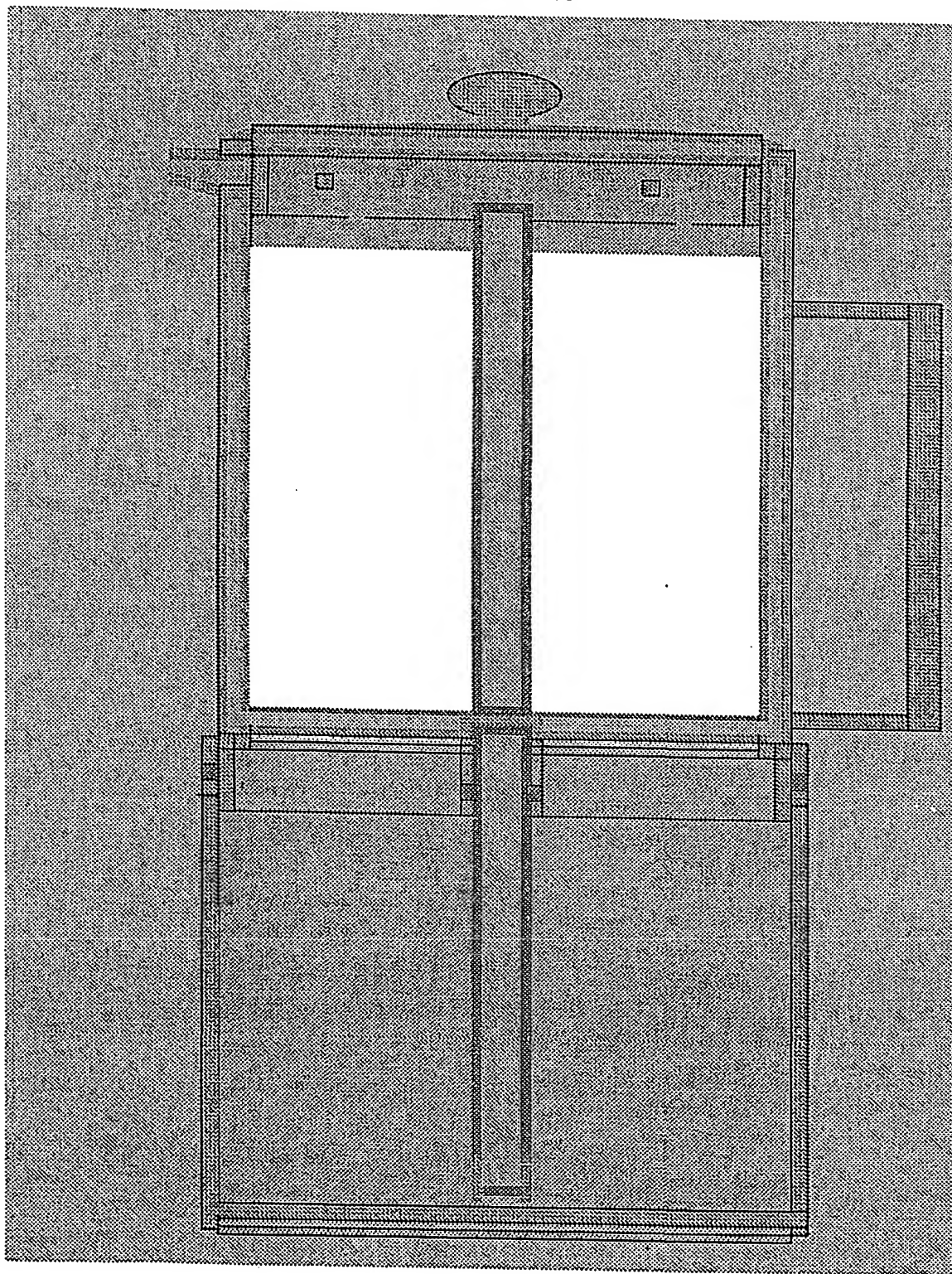
1. 1.

2. 2.

3. 3.

12/12

FIGURE 16



1. 1

2. 2

3. 3

## INTERNATIONAL SEARCH REPORT

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PCT/BR 02/00016

## CLASSIFICATION OF SUBJECT MATTER

IPC<sup>7</sup>: A47J 27/58, 27/56

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC<sup>7</sup>: A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, DEPATISNET

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	WO 01/30217 A1 (ALVES, Helio) 3 May 2001 (03.05.01) <i>abstract; figs. 8,10; claims.</i>	1-6
A	US 5800852 A (Levinson) 1 September 1998 (01.09.98) <i>abstract; fig. 1.</i>	1
A	EP 0838186 A1 (MOKADOSE S.R.L.) 29 April 1998 (29.04.98) <i>fig. 2,3.</i>	1

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of mailing of the international search report

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/BR 02/00016-0

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